

PCT

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

COPY

Applicant's or agent's file reference TRUTECH P-30		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US03/24165	International filing date (day/month/year) 01 August 2003 (01.08.2003)	Priority date (day/month/year) 01 August 2002 (01.08.2002)	
International Patent Classification (IPC) or national classification and IPC IPC(7): B32B 15/00, 31/00; B24B 5/00 and US Cl.: 451/64; 428/698, 702, 704, 457			
Applicant STEVEN G SMARSH			

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OCT 18 2004

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 24 February 2004 (24.02.2004)	Date of completion of this report 14 September 2004 (14.09.2004)
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Ling X. Xu Jean Proctor Paralegal Specialist Telephone No. 571-272-1700

I. Basis of the report**1. With regard to the elements of the international application:***

- ☐ the international application as originally filed.
- ☒ the description:
pages 1-16 as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____
- ☒ the claims:
pages 17, as originally filed
pages 17-19, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages NONE, filed with the letter of _____
- ☒ the drawings:
pages 1/16-16/16, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item. These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☐ the claims, Nos. NONE
- ☐ the drawings, sheets/~~fig~~ NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

V. Reasoned statement under 36.2(a)(ii) with regard to novelty, inventive step, and industrial applicability; citations and explanations supporting such statement**1. STATEMENT**

Novelty (N)	Claims <u>6, 8-14</u>	YES
	Claims <u>1-5 and 7</u>	NO
Inventive Step (IS)	Claims <u>6 and 12-14</u>	YES
	Claims <u>1-5 and 7-11</u>	NO
Industrial Applicability (IA)	Claims <u>1-14</u>	YES
	Claims <u>NONE</u>	NO

2. CITATIONS AND EXPLANATIONS

Claims 1-5 and 7 lack novelty under PCT Article 33(2) as being anticipated by Nobuo Shioda (JP-63-116747).

Shioda discloses a grinding machine comprising rotating grindstone and fixed grindstone, which have a metal disk and circular ceramic grindstone layer formed on the metal disk. The preferred ceramic material including silicon nitride and aluminum nitride. The grindstones are made from the same material as claimed and therefore, would have the same properties as recited in claims 4-5.

Claims 8-11 lacks an inventive step under PCT Article 33(3) as being obvious over Nobuo Shioda (JP-63-116747). Although Shioda does not disclose the specific metal for the metal disk as claimed, however, the metals recited in claims 8-11 are metals commonly used in the grinding machine and therefore would have been obvious to one of ordinary skill in the art to use these metal for the grindstones in Shioda's grinding machine.

Claims 6 and 12-14 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the grinding machine component as claimed.

Claims 1-14 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in the grinding machine industry.

----- NEW CITATIONS -----

US 5,738,564 (Helle et al) 14 August 1998, abstract and column 4, lines 1-67.

US 5,414,963 (Watanabe et al) 16 May 1995, column 2, lines 55-67 and column 3, line 1-67.

JP 63-116747 (Nobuo Shioda) 21 May 1988, abstract.

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CLAIMS

What is claimed is:

- 5 1. A wear resistant grinding machine component, comprising:
 a grinding machine component made of a solid ceramic material selected
 from the group consisting of carbides, nitrides, oxides, borides, cermets, carbonitrides, and
 combinations thereof.
- 10 2. An extremely high precision wear resistant grinding machine
 component for a high precision centerless grinding machine, comprising:
 a grinding machine component made of a solid piece of an extremely
 rigid and very hard, non-flexing material selected from the group consisting of ceramics,
 carbides, nitrides, borides, oxides, oxynitrides, carbonitrides, alumina, cermets, nitrides,
15 borides, oxides, and combinations thereof,
 wherein the grinding machine component may include the entire
 component being made of a ceramic material, a sleeve of solid ceramic material adhered over
 a metallic substrate base, and a grinding machine component made of a cermet material,
 formed into a grinding machine component.
- 20 3. The grinding machine component of claim 1, wherein the grinding
 machine component is selected from the group consisting of tension rods, transfer ways,
 spindles, spindle housings, pivot rods, threaded shaft rods, concentric shaft seals, lead screws,
 and combinations thereof.
- 25 4. The grinding machine component of claim 1, wherein the grinding
 machine component is non-flexing and maintains a very high tolerance of from about
 0.000005 inch to about 0.000030 inch.
- 30 5. The grinding machine component of claim 1, wherein the grinding
 machine component enables a repeatability factor of from about 0.000005 inch to about
 0.000030 inch.

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6. The grinding machine component of claim 1, wherein the grinding machine component is made of a metallurgically infiltrated cermet material made from a spongy ceramic and then infiltrated with a molten metal which is thereafter allowed to solidify within the matrix of the spongy ceramic.

7. The grinding machine component of claim 1, wherein the grinding machine component further includes a metallic component incorporated into the ceramic material to increase the strength of the component.

8. The grinding machine component of claim 7, wherein the grinding machine component further includes a metallic component in the ceramic material selected from the group consisting of cobalt, vanadium, chromium, manganese, nickel, copper, zinc, molybdenum, cadmium, indium, tin and combinations thereof.

9. The grinding machine component of claim 7, wherein the grinding machine component further includes the metallic component in a concentration of from about 1 to about 50 percent by weight.

10. The grinding machine component of claim 1, wherein the ceramic grinding machine component further includes a magnetic component including a component selected from the group consisting of powdered iron, niobium, yttrium and combinations thereof.

11. The grinding machine component of claim 10, wherein the grinding machine component further includes the magnetic component in a concentration of from about 1 to about 25 percent by weight.

12. The grinding machine component of claim 1, wherein the grinding machine component may be formed into a grinding machine component by forming a hard surface layer by a method selected from the group consisting of carburizing and carbonitriding.

13. The grinding machine component of claim 12, wherein the grinding machine component formed into a grinding machine component by carburizing is accomplished by carburizing by a method selected from the group consisting of gas

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carburizing by placing in a carburizing gaseous atmosphere, pack carburizing by placing all the surfaces in contact with a solid compound, and combinations thereof.

14. The grinding machine component of claim 12, wherein the grinding machine component is formed into a grinding machine component by carbonitriding by dissociating ammonia into hydrogen and nitrogen.

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DERWENT-ACC-NO: 1988-179392

DERWENT-WEEK: 198826

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TITLE: Segment type ceramic grindstone - comprises metal disc
and circular ceramic grindstone layer formed by arranging
fan-shaped moulded grindstone segments

PATENT-ASSIGNEE: MASUDA T[MASUI]

PRIORITY-DATA: 1986JP-0262307 (November 4, 1986)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
JP 63116747 A	May 21, 1988	N/A	004	N/A

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP 63116747A	N/A	1986JP-0262307	November 4, 1986

INT-CL (IPC): B02C007/12, B24D007/06

ABSTRACTED-PUB-NO: JP 63116747A

BASIC-ABSTRACT:

Rotating grindstone and fixed grindstone placed opposite each other, which are incorporated in high speed grinding machine, comprises metal disk and circular ceramic grindstone layer formed on the disk, which is formed by arranged fan-shaped moulded grindstone segments.

Preferable ceramic materials used are zirconia ceramics and ceramics comprising silicon nitride, aluminium nitride, titanium nitride, boron nitride, silicon carbide, titanium carbide or tungsten carbide etc. Ceramic segments, e.g. zirconia ceramic segments, are obtained by mixing yttrium oxide and ZrO₂, moulding in the form of fan and firing at 1800-2000 deg C. ADVANTAGE - Ceramic grindstone with large radius is produced at relatively low cost. Break of grindstone caused by shrink of ceramics on firing is prevented. Damaged ceramic parts are easily replaced. Previously ground glass particles with size of several μm are ground and particles with desired particle distribution and with purity of 99.9999% are obtained.

CHOSEN-DRAWING: Dwg.0/4

TITLE-TERMS: SEGMENT TYPE CERAMIC GRINDSTONE COMPRISE METAL DISC CIRCULAR
CERAMIC GRINDSTONE LAYER FORMING ARRANGE FAN SHAPE MOULD GRINDSTONE
SEGMENT

DERWENT-CLASS: L02 P41 P61

CPI-CODES: L02-F01;

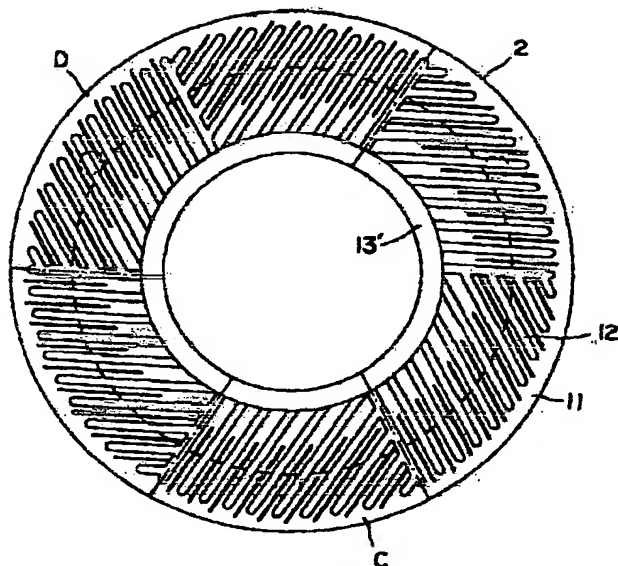
SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1988-080090

Non-CPI Secondary Accession Numbers: N1988-137016

特開昭63-116747 (4)

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